

**p. 5, 1st paragraph under "Detailed Description:"**

One embodiment of this invention is a filter with 4 transmission poles and 2 trap resonators (total 6 holes), shown in Figures 4A-4B. Capacitances C1, C2 and C3 are shown in Figure 4B.

**p. 6, 3rd full paragraph (Twice Amended):**

Fig. 4B shows parameters C1, C2 and C3. C1 is controlled by the distance between pattern 1 of conductive material for input/output electrode and pattern 3 of conductive electrode connected to conductive material on the inner surface of hole of  $\Theta 1$  resonator (Fig. 3), and C3 is controlled by the distance between pattern 1 and pattern 3 of conductive material connected to conductive material on the inner surface of hole of  $\Theta 2$  resonator (Fig. 3). C1, C2 and C3 are capacitances of coupling as described above in Figure 4B. Z is an inductive coupling and is controlled by the pattern 2 of conductive material that is opposed to the pattern 1 and is connected to the conductive material on the side wall. The relationship of C1, C2 and C3, to each other is as follows,  $C1 > C3 > C2$ .

**p. 6, last paragraph:**

Figure 5 shows the electrical data of the filters developed by the existing technology and by our new technology along with the requested specification. Although the present invention's filter is smaller, due to the less amount of holes, than currently available filters, its performance matches the electrical performance of larger filters using presently available technology. The electrical performance of the present invention (the filter of Figure 3) is represented by the rigid lines as is shown in Figure 5. The electrical performance of a prior art filter (the filter of Figure 2) is represented by the broken line as shown in Figure 5.

**p. 7, 1st full paragraph (Twice Amended):**

We can also apply the concepts of this new filter technology to a duplexer. Figures 7A-7B is an embodiment of a printed pattern duplexer of the present invention. Figure 6 is its equivalent circuit for a duplexer designed in accordance with another embodiment of the present invention. Figure 6 and Fig. 7A-7K show examples of new equivalent circuits and printed patterns, as applied to a duplexer. The duplexer of Fig. 6 and Figs. 7A-7B has eight (8)

transmission poles 20,  $\Theta 1$ ,  $\Theta 2$ ,  $\Theta 3$  and  $\Theta 4$  and three (3) trap resonators, 40 on each end of the duplexer and  $\Theta 1$  resonator, but it can work as a filter with nine (9) transmission poles including  $\Theta 1$ , and three (3) trap resonators, also including  $\Theta 1$ . In most cases, the higher band is the receiver band and the lower band is the transmitter band at the mobile phone terminal sides. These designations become reversed at the base station sides. However, it is noted that the relationship of the receiver band and the transmitter band, on the one hand, and the higher/lower bands on the other hand are not always consistent.

**p. 8, Insert these paragraphs after paragraph beginning with "Figures 7C-7K" from previous amendment:**

In particular, Figures 7C-7K allow for the concept of a resonator  $\Theta 1$  working as both a transmission pole and as a trap resonator. Such a resonator  $\Theta 1$  allows for a duplexer that requires minimal space. The resonator  $\Theta 1$  acts as a transmission pole and as a trap resonator because of the unique relationship between the capacitances of coupling,  $C1$ ,  $C2$  and  $C3$ , in the manner as is described for Figures 4B and 7B above. The unique pattern of the duplexers allow for the resonator  $\Theta 1$  to act as both a trap resonator and a transmission pole. In particular, Figure 7C-7K show that using the inventive patterns taught in the present application, one may vary the number of transmission poles and trap holes as desired and still obtain a duplexer that is smaller in size than traditional duplexers because of a resonator acting as a trap hole and trap resonator.

Figure 7C and corresponding equivalent circuit in Figure 7D show 8 transmission poles 20 and a resonator  $\Theta 1$ , which acts as both a transmission pole and a trap resonator due to the relationship of capacitance couplings  $C1$ ,  $C2$  and  $C3$  and inductance  $Z$ . Figure 7E and corresponding equivalent circuit in Figure 7F show 7 transmission poles 20, a trap resonator 40 and a resonator  $\Theta 1$ , which acts as both a transmission pole and a trap resonator due to the relationship of capacitance couplings  $C1$ ,  $C2$  and  $C3$  and inductance  $Z$ . Figure 7G and corresponding equivalent circuit in Figure 7H show 5 transmission poles 20, 2 trap resonators 40 and resonator  $\Theta 1$ , which acts as both a transmission pole and a trap resonator due to the relationship of capacitance couplings  $C1$ ,  $C2$  and  $C3$  and inductance  $Z$ . Figure 7J and corresponding equivalent circuit in Figure 7K show 5 transmission poles 20, a trap resonator 40 and a resonator  $\Theta 1$ , which acts as both a transmission pole and a trap resonator due to the relationship of capacitance couplings  $C1$ ,  $C2$  and  $C3$  and inductance  $Z$ .

It should be noted that couplings C1, C2 and C3 work in a manner similar to that described for Figure 4B above to allow for resonator 01 to work as both a transmission pole and a trap resonator to allow for a reduced-size duplexer.

**p. 8, Insert these paragraphs after paragraph beginning with "Figure 8A" from previous amendment:**

In particular, Figure 8A shows resonators 01, 02 and 03, with 01 acting as both a transmission pole and a trap resonator because of the relationship between C1, C2 and C3 as described above.

**In the Drawings:**

The drawings have been labelled as requested in the office action and red-lined drawings showing the changes are submitted herewith.

**REMARKS**

**Objections to the Specification:**

The Office Action objected to the Disclosure for several informalities, as described on page 2. Accordingly, the Applicants have amended the disclosure to overcome the objections and have provided the requisite details for Figures 1, 2, 6, 7A, 7B, 7C, 7D, 7E, 7F, 7G, 7H, 7J, 7K, 8A and 8B. Applicants submit that they have not added any new matter and all amendments to informalities were fully supported in the application as originally filed.

Therefore, Applicants respectfully request that the objections be withdrawn.

**Objections to the Drawings:**

The Office Action objected to the Drawings for informalities, as described on page 2. Accordingly, the Applicants have amended the Drawings to conform with the Examiner's requests. The red-lined drawings have been submitted herein.

Therefore, Applicants respectfully request that the objections be withdrawn.